

09/445383

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Roland Levrai; Olivier Castello &
Richard Philippe

GROUP:

Self-Boosting Pneumatic Booster Using
A Pivoting Key

EXAMINER:

FILED: December 6, 1999

445
SERIAL NO. 09/455,383

South Bend, Indiana 46634

Hon. Commissioner of Patents and Trademarks
Washington, D.C. 20231

April 5, 2001

Preliminary Amendment

Sir:

Please amend this application as follows:

In the Specification

Page 1, between lines 35 and 36 insert --Background of the Invention--.

Page 2, between lines 13 and 14 insert --Summary of the Invention--.

Page 3, replace that portion of the paragraph beginning on line 36 with
the following rewritten paragraph:

--Other features and advantages of the invention will emerge clearly from
the description thereof given--.

Page 4, replace that portion of the paragraph beginning on line 1 with the
following rewritten paragraph:

--hereafter by way of non-limiting indication, with reference to the appended
drawings.

Brief Description of the Drawings--.

Page 5, before line 1 insert --Detailed Description of the Invention--.

Page 10, line 1 delete "CLAIM" and replace with --We claim:--.

In the Claims

Delete claims 1-5 and replace with the following claims.

6. A pneumatic brake booster comprising:
a rigid casing;

a moving partition for delimiting in a sealed way a front chamber and a rear chamber inside of said casing, said front chamber in operation being permanently connected to a first source of pressure having a first pressure;

a pneumatic piston moving said moving partition and having hub mounted to slide in an opening in said casing;

an operating rod that moves in said hub between a position of rest and an extreme actuating position as a function of a resultant of forces, said resultant of forces comprising an input force exerted in an axial actuating direction directed toward said front chamber and a main return force exerted by a main spring in an axial direction toward said rear chamber;

a plunger located in a bore of said hub and carried along by said operating rod; and

a three-way valve having a stationary annular valve seat formed on an internal periphery of said hub, a moving annular seat which is concentric to said stationary seat and borne by said plunger, and a tubular shutter concentric with said plunger and with said hub, said tubular shutter having an annular front shut-off face which co-operates selectively with said moving seat to isolate said rear chamber from a second source of pressure, said second source of pressure having a second pressure higher than said first pressure, said front shut-off face co-operating selectively with said stationary seat to allow said rear chamber to be connected to said second source of pressure, said plunger being characterised by a cylindrical body secured to said operating rod and a ring mounted to slide axially on said cylindrical body between a front stop and a rear stop, said ring having a front section located between said cylindrical body and said bore of said hub, said ring having a rear section which forms a collar on which said moving seat is defined, said front stop being separated from said rear stop by a distance which provides an axial excursion for said ring, and in that a secondary spring which exerts a secondary return force on said collar in said axial return direction to urge said collar toward said rear stop, and in that said ring and hub comprise first and second reversible retaining means for keeping said ring stationary with respect to said hub in opposition to said secondary return force acting on said ring to allow said rear chamber to be

connected to said second source of pressure, said first and second retaining means being activated by said ring being moved into said bore over a travel distance which is equal to a minimum travel distance and being deactivated when said ring engages and moves said front stop in said axial return direction under the effect of said main return force.

7. The booster according to claim 6 wherein said retaining means is characterised by a pivoting key which straddles said ring and an elastically retractable stop member connected to said hub, said retractable stop member intercepting said key and applying a determined retaining force on said key on activating said retaining means.

8. The booster as recited in claim 7 wherein said elastically retractable stop member is characterised by a flexible strand of an elastic snap ring secure to said hub.

9. The booster as recited in claim 6 wherein said retaining means is characterised by a pivoting key which straddles said ring and an electromagnet secured to said hub, said electromagnet being selectively operated to retain said pivoting key when said ring is moved into said bore over said minimum travel.

10. The booster as recited in claim 6 wherein said plunger is characterised by a push-rod having a sliding movement with respect to said cylindrical body, said push-rod being located in front of said cylindrical body in said actuating and having a shoulder which co-operates with said hub to limit the movement of said push-rod with respect to said hub in said axial return direction, said cylindrical body retaining said push-rod in a forward position of said actuating direction, said cylindrical body and said push-rod being in axial contact against each other when said cylindrical body is in said extreme actuating position, and shoulder of said push-rod co-operating with said hub to cause said axial contact to cease when said operating rod returns to a position of rest.

11. The booster as recited in claim 7 wherein said retaining means is characterised by a pivoting key which straddles said ring and an electromagnet secured to said hub, said electromagnet being selectively operated to retain

said pivoting key when said ring is moved into said bore over said minimum travel.

12. The booster as recited in claim 8 wherein said retaining means is characterized by a pivoting key which staddles said ring and an electromagnet secured to said hub, said electromagnet being selectively operated to retain said pivoting key when said ring is moved into said bore over said minimum travel.

13. The booster as recited in claim 7 wherein said plunger is characterized by a push-rod having a sliding movement with respect to said cylindrical body, said push-rod being located in front of said cylindrical body in said actuating and having a shoulder which co-operates with said hub to limit the movement of said push-rod with respect to said hub in said axial return direction, said cylindrical body retaining said push-rod in a forward position of said actuating direction, said cylindrical body and said push-rod being in axial contact against each other when said cylindrical body is in said extreme actuating position, and shoulder of said push-rod co-operating with said hub to cause said axial contact to cease when said operating rod returns to a position of rest.

14. The booster as recited in claim 8 wherein said plunger is characterised by a push-rod having a sliding movement with respect to said cylindrical body, said push-rod being located in front of said cylindrical body in said actuating and having a shoulder which co-operates with said hub to limit the movement of said push-rod with respect to said hub in said axial return direction, said cylindrical body retaining said push-rod in a forward position of said actuating direction, said cylindrical body and said push-rod being in axial contact against each other when said cylindrical body is in said extreme actuating position, and shoulder of said push-rod co-operating with said hub to cause said axial contact to cease when said operating rod returns to a position of rest.

IN THE ABSTRACT

Page 8 delete the entire ABSTRACT and replace with the following rewritten ABSTRACT.

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ABSTRACT

A pneumatic booster operated by a plunger (9) housed in a bore (61) and bearing on a moving seat (102) which co-operates selectively with a shut-off member (111). The shut-off member (111) is capable of selective co-operating with a stationary seat (101). The plunger (9) being characterized by a cylindrical body (91) and a ring (92). The ring (92) sliding between a front stop (911) and a rear stop (912) on the cylindrical body (91). A front section of the ring (92) being located between the cylindrical body (91) and the bore (61) while a rear section (922) is designed to bear against the moving seat (102). The ring (92) being temporarily retained in a stationary position in the bore (61) independent of any movement of the cylindrical body (91) through the action of a pivoting key (13) and an elastic snap ring (141) to allow permit and extended actuation of the booster after a sharp braking action has occurred.--.

Remarks

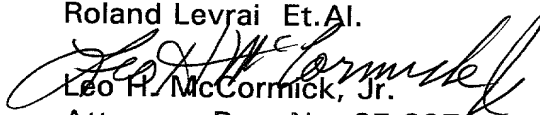
This Preliminary Amendment is submitted to remove reference numerals from the claims and bring the specification into current standards as defined in the United States Patent Office, i.e.: the specification has been amended through the addition of heading to identify the various parts and a new abstract has been added in accordance with current U.S. Patent Office practice.

Claims 1-5 have been canceled and new claims 6 and 14 have been added without the introduction of any new matter to correct indefiniteness that occurs in the translation of French text into English.

To assist in the examination of this application, a copy of the Preliminary Examination report, and PCT search report are included with this response.

The above amendments should place this application in better condition for examination and allowance, for which a notice is requested.

Respectfully submitted,
Roland Levrai Et. Al.


Leo H. McCormick, Jr.
Attorney, Reg. No. 25,897

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Box PCT, Commissioner of Patents and Trademarks, Washington, D.C. 20231 on April 5, 2001.



Leo H. McCormick, Jr.

Attorney, Reg. No. 25,897

We claim:

6. A pneumatic brake booster comprising:

a rigid casing;

a moving partition for delimiting in a sealed way a front chamber and a rear chamber inside of said casing, said front chamber in operation being permanently connected to a first source of pressure having a first pressure;

a pneumatic piston moving said moving partition and having hub mounted to slide in an opening in said casing;

an operating rod that moves in said hub between a position of rest and an extreme actuating position as a function of a resultant of forces, said resultant of forces comprising an input force exerted in an axial actuating direction directed toward said front chamber and a main return force exerted by a main spring in an axial direction toward said rear chamber;

a plunger located in a bore of said hub and carried along by said operating rod; and

a three-way valve having a stationary annular valve seat formed on an internal periphery of said hub, a moving annular seat which is concentric to said stationary seat and borne by said plunger, and a tubular shutter concentric with said plunger and with said hub, said tubular shutter having an annular front shut-off face which co-operates selectively with said moving seat to isolate said rear chamber from a second source of pressure, said second source of pressure having a second pressure higher than said first pressure, said front shut-off face co-operating selectively with said stationary seat to allow said rear chamber to be connected to said second source of pressure, said plunger being characterised by a cylindrical body secured to said operating rod and a ring mounted to slide axially on said cylindrical body between a front stop and a rear stop, said ring having a front section located between said cylindrical body and said bore of said hub, said ring having a rear section which forms a collar on which said moving seat is defined, said front stop being separated from said rear stop by a distance which provides an axial excursion for said ring, and in that a secondary spring which exerts a secondary return force on said collar in said axial return direction to urge said collar toward said rear stop, and in that

said ring and hub comprise first and second reversible retaining means for keeping said ring stationary with respect to said hub in opposition to said secondary return force acting on said ring to allow said rear chamber to be connected to said second source of pressure, said first and second retaining means being activated by said ring being moved into said bore over a travel distance which is equal to a minimum travel distance and being deactivated when said ring engages and moves said front stop in said axial return direction under the effect of said main return force.

7. The booster according to claim 6 wherein said retaining means is characterised by a pivoting key which straddles said ring and an elastically retractable stop member connected to said hub, said retractable stop member intercepting said key and applying a determined retaining force on said key on activating said retaining means.

8. The booster as recited in claim 7 wherein said elastically retractable stop member is characterised by a flexible strand of an elastic snap ring secure to said hub.

9. The booster as recited in claim 6 wherein said retaining means is characterised by a pivoting key which straddles said ring and an electromagnet secured to said hub, said electromagnet being selectively operated to retain said pivoting key when said ring is moved into said bore over said minimum travel.

10. The booster as recited in claim 6 wherein said plunger is characterised by a push-rod having a sliding movement with respect to said cylindrical body, said push-rod being located in front of said cylindrical body in said actuating and having a shoulder which co-operates with said hub to limit the movement of said push-rod with respect to said hub in said axial return direction, said cylindrical body retaining said push-rod in a forward position of said actuating direction, said cylindrical body and said push-rod being in axial contact against each other when said cylindrical body is in said extreme actuating position, and shoulder of said push-rod co-operating with said hub to cause said axial contact to cease when said operating rod returns to a position of rest.

11. The booster as recited in claim 7 wherein said retaining means is characterised by a pivoting key which staddles said ring and an electromagnet secured to said hub, said electromagnet being selectively operated to retain said pivoting key when said ring is moved into said bore over said minimum travel.

12. The booster as recited in claim 8 wherein said retaining means is characterized by a pivoting key which staddles said ring and an electromagnet secured to said hub, said electromagnet being selectively operated to retain said pivoting key when said ring is moved into said bore over said minimum travel.

13. The booster as recited in claim 7 wherein said plunger is characterised by a push-rod having a sliding movement with respect to said cylindrical body, said push-rod being located in front of said cylindrical body in said actuating and having a shoulder which co-operates with said hub to limit the movement of said push-rod with respect to said hub in said axial return direction, said cylindrical body retaining said push-rod in a forward position of said actuating direction, said cylindrical body and said push-rod being in axial contact against each other when said cylindrical body is in said extreme actuating position, and shoulder of said push-rod co-operating with said hub to cause said axial contact to cease when said operating rod returns to a position of rest.

14. The booster as recited in claim 8 wherein said plunger is characterised by a push-rod having a sliding movement with respect to said cylindrical body, said push-rod being located in front of said cylindrical body in said actuating and having a shoulder which co-operates with said hub to limit the movement of said push-rod with respect to said hub in said axial return direction, said cylindrical body retaining said push-rod in a forward position of said actuating direction, said cylindrical body and said push-rod being in axial contact against each other when said cylindrical body is in said extreme actuating position, and shoulder of said push-rod co-operating with said hub to cause said axial contact to cease when said operating rod returns to a position of rest.

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ABSTRACT

A pneumatic booster operated by a plunger (9) housed in a bore (61) and bearing on a moving seat (102) which co-operates selectively with a shut-off member (111). The shut-off member (111) is capable of selective co-operating with a stationary seat (101). The plunger (9) being characterized by a cylindrical body (91) and a ring (92). The ring (92) sliding between a front stop (911) and a rear stop (912) on the cylindrical body (91). A front section of the ring (92) being located between the cylindrical body (91) and the bore (61) while a rear section (922) is designed to bear against the moving seat (102). The ring (92) being temporarily retained in a stationary position in the bore (61) independent of any movement of the cylindrical body (91) through the action of a pivoting key (13) and an elastic snap ring (141) to allow permit and extended actuation of the booster after a sharp braking action has occurred.